

Zero Retries issue 0059 2022-08-12

Zero Retries is a unique, quirky little highly independent, opinionated, self-published email newsletter about technological innovation in Amateur Radio, for a self-selecting niche audience, that's free (as in beer) to subscribe.

About Zero Retries

Steve Stroh N8GNJ, Editor

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This issue of Zero Retries is pseudosponsored¹ by [Dire Wolf “Soundcard” AX.25 packet modem / TNC and APRS encoder/decoder](#). If you have the *rare* software chops and a background in Amateur Radio data (packet radio) communications, in my opinion, Dire Wolf is *the* most vibrant, worthy-of-your-efforts open source project in Amateur Radio Data Communications. Dire Wolf is led (primary contributor) by John Langner WB2OSZ. Notably, Dire Wolf has implemented *two* forward error correction systems - [FX.25](#) and [IL2P](#), which moves Amateur Radio Packet Radio into new capabilities.

Request To Send

Countdown to [Digital Communications Conference 2022](#) - September 16-18, in Charlotte, North Carolina, USA:

~~10 09 08 07 06 05~~ weeks...

Countdown to DCC 2022 Paper submission deadline - September 1:

~~~08 ~07 ~06 ~05 ~04 ~03~~ weeks...

This week had some major (time consuming) and urgent tasks that constrained my time to work on Zero Retries. As I put the finishing touches on this issue just a few hours before publication time at 15:30 Pacific, I'm a bit wrung out from sitting in front of the computer most of this week. This weekend is projected to be two more gorgeous summer days here in Bellingham, WA, thus I'm declaring a moratorium from my usual

temptation to sit in my office working on Zero Retries. *This* weekend will be for catching up on a bunch of physical chores, including the “special project” I hinted at a few issues ago.

de N8GNJ

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## [Engineers on the Brink of Extinction Threaten Entire Tech Ecosystems](#)

*Disclaimer - this story is only tangentially related to Amateur Radio (tied together, loosely, at the end of the story). If your focus is **entirely** Amateur Radio, skip to the next article.*

The Register is a snarky, irreverent, sometimes humorous online publication, but sometimes it hits home, as it does with this piece.

Intel has produced some unbelievable graphs in its time: projected Itanium market share, next node power consumption, multicore performance boosts. The graph the company showed at the latest VLSI Symposium, however, was a real shocker. While computer science course take-up had gone up by over 90 percent in the past 50 years, electrical engineering (EE) had declined by the same amount. The electronics graduate has become rarer than an Intel-based smartphone. That part of the technology industry which makes actual things has always been divided between hardies and softies, soldering iron versus compiler, oscilloscope versus debugger. But the balance is lost. Something is very wrong at the heart of our technology creation supply chain. Where have all the hardies gone?

The entire article is worth reading. This situation has been known for decades now. In fact, the [Raspberry Pi single board computers were created to address just this issue](#) - declining interest in understanding actual hardware, rather than just learning software, with the hardware as an underlying abstract layer.

This issue is all the more poignant in the wake of the [US The Chips Act of 2022](#) which allocates \$54.2B for a number of programs relating to increasing the manufacturing of semiconductors in the US, including this Zero Retries Interesting item:

Public Wireless Supply Chain Innovation Fund: \$1.5 billion through DOC National Telecommunications and Information Administration (“NTIA”), in coordination with NIST, the Department of Homeland Security, and the Director of National Intelligence, among others, to spur movement towards open-architecture, software-based wireless technologies, funding innovative, ‘leap-ahead’ technologies in the U.S. mobile broadband market.

Just one problem comes to mind...

***Where are they going to get all the highly talented people that will be needed to make this initiative a reality?***

One of the hidden vulnerabilities of semiconductor fabrication is that it requires incredibly (practically unbelievable) high levels of quality control. Semiconductor manufacturing is *totally* binary; either you do *everything perfectly, all the time*, or the output of the semiconductor fabrication plant is **junk**. You really, *really* gotta know what you’re doing! In the US there simply hasn’t been that much demand for engineers for semiconductor fabrication... thus we don’t *have* many (demand vs supply). The US **does** make chips - Intel’s biggest US fabs are in Portland, OR! But most of the knowledge of cutting edge semiconductor fabrication is in Taiwan; they’re ahead of Intel these days.

Bringing it back to Zero Retries Interesting - *where are we going to get the engineers that grasp wireless well enough to create “leap-ahead technologies” cited in the Chips Act of 2022?*

In some ways, the US is holding its own on wireless technology. One stellar example is [Starlink](#) - satellites, ground terminals, and infrastructure units all designed and manufactured in the US (and, of course, all launched from the US). Another bright spot is [Qualcomm](#), headquartered in the US. Motorola is still around, having distilled itself down to [Motorola Solutions](#) providing public safety two-way radio systems. Of course, there’s

**FlexRadio Systems** who started from an Amateur Radio “hobby project gone horribly wrong” to a [supplier of radio systems to the US government](#). And the US Department of Defense [could not fight without wireless technology](#).

But, the US no longer makes cell phones. Maybe that’s OK. At least we design them in the US (mostly - [Apple](#)). It seems to me that if we (the collective we, as in a collective effort of the US technology industry, US government, academia, etc.) don’t want radio technology development and infrastructure in the US to be eventually ceded by default to China because of the “pipeline” of radio technology specialists slowing to a trickle. If we don’t want that, *we gotta* start taking the slowing “pipeline” of radio technology specialists *seriously* by investing in deep understanding, competency and significant numbers of radio technology specialists.

This isn’t the first time the US had such a crisis in underinvestment in technology education. One of the first was the [Sputnik Crisis](#).

[President Eisenhower] also noted the importance of education for the Russians in their recent scientific and technological progress, and for America's response to the Russians. He remarked, “we need scientists in the ten years ahead... scrutinize your school's curriculum and standards. Then decide for yourselves whether they meet the stern demands of the era we are entering.”

Amateur Radio *can help the lack of radio technology specialists* by giving them a head start in understanding radio technology... *if* we can get them interested *in* Amateur Radio. *How?* Aye, *there’s* the rub. There are a lot of *independent* efforts doing so. Amateur Radio Digital Communications (ARDC) has been [active in this area](#) by providing a diversity of grants such as:

- [Grant: Fernwood Elementary HF/ ARDEN Station](#)
- [Jasmine and José Build a Radio Introduces School-Age Kids to the Science of Radio](#)
- [NRAO \[National Radio Astronomy Observatory\] Program Designed to Educate Emerging Generation of Scientists Using Amateur Radio](#)

There is also the [ARRL Education & Technology Program](#).

You get the idea.

I’ll publish the results of the poll in Zero Retries 0060.

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**New ARRL Radio Lab Will Inspire Your Ham Shack!**

*As much as I criticize the ARRL for being on the **trailing** edge of Amateur Radio technological innovation, **I really strive to be fair**. Thus... *this* experiment / project of the ARRL to reimagine (and demonstrate) the “Amateur Radio Shack of the future / *present*” is, in my opinion, a worthy effort. It’s notable that the “reveal” of this experiment / project didn’t emerge as a staid, truncated text-with-a-few photographs article in QST (accessible only to ARRL members, and truncated by nostalgia and contest results) but as a vibrant “anyone can view” *video*.*

This mode of operation (virtualized radios operated remotely via broadband Internet and computer) is becoming more common as many Amateur Radio Operators have to contend with Covenants, Conditions, and Restrictions (CC&Rs) that prohibit external antennas, rising HF noise levels in urban environments, and other constraints. Some Amateur Radio clubs are creating virtual stations that can be shared among club members to be remotely operated.

Of course, being an Amateur Radio Operator “of long experience” I have a few quibbles about the system shown in the video, like the stilted user interface of radio operations, especially HF radio operations, as “clunky” with merely a mouse / keyboard / display. Even just a knob that’s a USB peripheral, such as the [FlexControl USB Controlled Tuning Knob](#) can make radio operations much easier. I’m a fan of the dedicated radio console such as the [FlexRadio Maestro radio control panel](#).

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## **Beware “Signal Enhancement Setting” on Windows 10**

[Scott Currie NS7C via the VARA-MODEM mailing list:](#)

While setting up a new system yesterday, a brand new Dell Optiplex 7000 computer, we were having trouble getting UZ7HO HS\_Soundmodem to decode reliably on 9600 packet using a DRA-50 sound card. The problem turned out to be an option in the Windows advanced sound settings under the Recording tab:

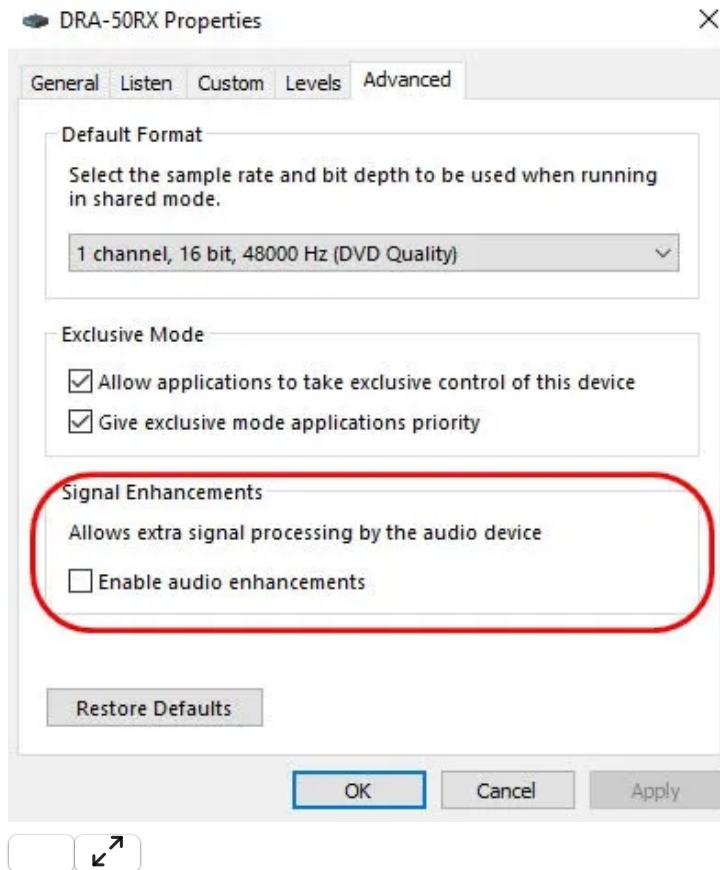


Image courtesy of Scott Currie NS7C

Do not enable this option (and it is enabled by default)! I'm not really sure what it does, but it really messed up 9600 packet, and I suspect it would also affect Vara FM. I have checked multiple systems, but only found this option present on the Dell.

In a later message, NS7C clarified that this particular computer was using Windows 10, but that he expected this setting to also be present in Windows 11.

Stephen Smith WA8LMF added to this thread:

This has been a standard part of the Windows audio device settings dialogs since Windows Vista. “Signal Enhancements” applies various DSP (digital signal processing) to the input audio stream (Mic or Line-In).

The “Softies” seem to think that the only use for audio input in Windows is for voice applications such as Skype, Zoom, VoIP telephony, Speech-to-Text, etc. The “Signal Enhancements” reduce audio bandwidth, so AC hum, mechanical noises like electric motors, etc are less obvious. It tries to remove white noise such as wind blowing on mics, or rushing air from fans. It also applies a level-triggered audio gating so low-level background noises such as traffic or household appliances don't get fed into your outgoing Skype or Zoom call audio when you aren't talking.

If you try to use the Windows audio inputs in the default mode (Enhancements ON) for music recording or ham soundcard apps, this hidden added audio manipulation absolutely mangles the audio-in. [This is similar to the DSP noise reduction in many modern transceivers that you are urged to turn off for digi modes.] High-frequency audio components like brushed drums or cymbals, the attack of plucked strings (guitars, pianos, etc) or the high-frequency components of the various beeps, warbles and squawks of ham digi modes are falsely identified as “white noise” to be removed.

Be default, every added audio-input device added to Windows (such as Signalinks, internal “sound cards” in newer transceivers, etc) will also have the signal-mangling “Enhancements” enabled. It's up to you to turn this nuisance off for each new device.

I've noted previously that the multiplicity of audio settings on Windows are a *minefield* of ways to trip up Amateur Radio data communications on Windows.

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## ZR > BEACON

- **Indian Schoolgirls' Satellite Launched with 75 Experiments**  
(from [Amateur Radio Newline Report 2336 for Friday August 5th, 2022](#))  
*A satellite built by girls in India has been stirring some excitement.*

...

*A small satellite built by 750 schoolgirls in India, will be on board for the maiden flight of the Indian Space Research Organization's Small Satellite Launch Vehicle this month. The students were mentored by SpaceKidz India in the construction of this 8-kilogram satellite. It carries 75 small experiments, a camera to study solar panels in space and a variety of long range communications transponder experiments. The satellite also has a messaging system for amateur radio operators. Although this is not the first student satellite built with the help of SpaceKidz India, this one is [different] because it carries its own power systems and batteries to power an anticipated six-month-long orbit. This satellite is not, of course, the main payload for the launch vehicle. The rocket will also be carrying the Microsat 2A, which is designed to assist in the mapping of parcels of land. At the time Newline went to production, the launch was scheduled for August the 7th.*

...

**More info about [AZAADISAT and Space Kidz India](#):**

*“AZAADISAT” is a satellite mission with the ambitious vision to encourage Government school children (from economically weak backgrounds) with the basic understanding and knowledge of space and tutor them to build a small experiment and launch it to the edge of space through a “Balloon Satellite” or through an “Orbital Satellite”.*

...

**Unfortunately, AZAADISAT was lost during the launch phase on August 6, 2022:**

[India's new SSLV rocket fails in first launch](#)

*The inaugural launch of India's Small Satellite Launch Vehicle (SSLV) failed to reach orbit Aug. 6 when the rocket's kick stage malfunctioned. The three-stage vehicle, capable of placing up to 500 kilograms of payload to a 500-kilometer low Earth orbit, lifted off at 11:48 p.m. Eastern from Satish Dhawan Space Centre's launch pad No.1, carrying the 135-kilogram Earth observation satellite EOS-02 built by the Indian space agency ISRO and an eight-kilogram cubesat AzaadiSAT, made by Indian students.*

...

*ISRO announced that the [Velocity Trimming Module (VTM)] had malfunctioned, deploying the satellites into an elliptical orbit of 76 by 356 kilometers, instead of the intended circular orbit of 356 kilometers. “Satellites are no longer usable,” ISRO stated, and likely reentered over the Pacific Ocean.*

...

*It's a disappointing, but poignant lesson that Space... especially launches leaving Earth's gravity well... **is hard**. You either get *everything* right, or you lose the rocket and payload. For the girls in India that built AZAADISAT, I hope they can absorb the “lesson” that it's *not how many times you get knocked down*, it's *how many times you get back up*! I hope someone funds **AZZAADISAT 2**, and quickly.*

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## Zero Retries Sponsorships

The Zero Retries sponsorship model is *evolving*, but it's initially inspired by the [Daring Fireball blog's sponsorship model](#) (other than this sponsorship cost). Some initial points:

Sponsorship of Zero Retries is only available to “Zero Retries Interesting” companies, organizations, individuals, and projects. Ideally, a Zero Retries sponsor is involved in Amateur Radio, but that's not an

absolute requirement. If an individual or company would like to sponsor Zero Retries, but prefer to remain anonymous, that's acceptable, but the "Zero Retries Interesting" criteria still apply.

- Sponsorships are limited to a *brief* mention in Zero Retries - a few sentences at most (but prominently displayed). Example - "WhizzyPacket is proud to sponsor this week's Zero Retries". More targeted sponsorship messages are acceptable, such as "WhizzyPacket is looking for a few good engineers - click [here](#)".
- A sponsorship is for *one* weekly issue of Zero Retries and is exclusive - one sponsor per week. Sequential sponsorships are available - as much as three months of sponsorship is acceptable. Longer than three months, let's discuss it.
- Lastly, although it kind of defeats the overt purpose of sponsorship, if a *Zero Retries Interesting company, organization, individual, or project cannot afford to pay for a sponsorship*, but wants / needs to "get the word out", Zero Retries can probably work something out. In fact, if there are gaps in sponsorships, I'll probably create some gratis sponsorship messages.

If you are interested in sponsoring Zero Retries, please reach out - it's early days. More importantly, if you know of a company, organization, project, or individual that you think could / would / should sponsor Zero Retries, *please point out Zero Retries to that entity*.

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## Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, check out

**Join the Fun on Amateur Radio** for some pointers.

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## Closing the Channel

In its mission to highlight technological innovation in Amateur Radio, promote Amateur Radio to techies as a literal license to experiment with wireless technology, and make Amateur Radio more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to anyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex, which hides Amateur Radio content behind paywalls.

My ongoing *Thanks* to:

- Tina Stroh KD7WSF for, well, *everything*!
- Pseudostaffer [Dan Romanchik KB6NU](#) for continuing to spot, and write about "Zero Retries Interesting" items on his blog that I don't spot on my own.
- [Amateur Radio Weekly](#) and [Southgate Amateur Radio News](#) consistently surface "Zero Retries Interesting" stories.
- The [Substack email publishing platform](#) makes Zero Retries possible. I recommend it for publishing newsletters.

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[Zero Retries on Twitter](#)

*Please tell your friends and co-conspirators about Zero Retries - just click:*

Share Zero Retries

Offering **feedback or comments** for Zero Retries is equally easy; yes, you guessed it... just click:

Leave a comment

Email issues of Zero Retries are “instrumented” by [Substack](#) to gather basic statistics about opens, clicking links, etc. I don’t use such information in any way other than seeing that most subscribers actually do read Zero Retries.

More bits from Steve Stroh N8GNJ:

- [SuperPacket blog](#) - *Discussing new generations of Amateur Radio Data Communications - beyond Packet Radio (a precursor to Zero Retries)*
- [N8GNJ blog](#) - *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs - Bellingham, Washington, USA*

Thanks for reading!

Steve Stroh N8GNJ / WRPS598 (He / Him / His)

These bits were handcrafted in beautiful Bellingham, Washington, USA

2022-08-12

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[1](#)

“Pseudosponsored” is my created name for a “sponsorship” message that wasn’t actually solicited by the organization cited.